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NOTES ON ANABANTIDS. III.[1]

A reference in Dean's *Bibliography of Fishes* brings to mind the fact that most ichthyologists are still under the erroneous impression that the fighting-fish of Siam is *Betta pugnax* (Cantor). Ever since Cantor's account, in his *Catalogue of Malayan Fishes*, 1850 (pp. 84, 86), it has been supposed that the "variety" he describes is a domesticated race of *pugnax* bred especially for fighting. The correct version was indicated in Regan's review of the Asiatic Anabantids (P. Z. S. 1909, pp. 767–787). *Betta pugnax* is known only from Cantor's types and perhaps a few specimens obtained some years ago by German aquarists. The Fighting Fish of Siam (Cantor's "domesticated variety"), is a species common in Siam and Lower Siam. It has been aptly named *Betta splendens* by Regan, and has nothing to do with the much larger and very different *pugnax*. An interesting, though perhaps not strictly accurate, account of modern fish-fighting in Siam, is given by Miss Florence B. Meehan in "The Heavenly Royal City of Siam", in *Asia* Magazine for March 1921.

1. Contributions from the Zoölogical Laboratory of Indiana University, No. 206.

From this it is evident that the fish are not bred for fighting but merely caught in the canals of Bangkok when needed for a fight. That the fish "burst" with anger is rather absurd, as will be apparent to anyone familiar with the species.

The Fighting Fish is well known to aquarists in this country, though usually masquerading under the erroneous name *Betta rubra* Perugia. Examples are obtainable in any large city and they make interesting aquarium inhabitants. The male, when in anger, probably surpasses any fish known in brilliance of display.

Similar to stories of a domesticated breed of fighting fishes are the current accounts of the Paradise Fish. Though usually referred to as *Macropodus viridi-auratus* Lacépède, it is generally conceded, in the textbooks, to be a cultivated race of *Macropodus opercularis* (Linné). The latter fish is supposed to be the dull-colored, dark-barred species with a rounded caudal found throughout central China. The Paradise Fish has a forked caudal with long, attenuated tips, and the bars are bright red and blue. All the fins are larger than those of "opercularis".

Regan's account does not help us here for he includes both forms under the name *opercularis*. Referring to Linné's original description of *opercularis*,[2] we find that it is the Paradise Fish and not the round-tailed "*opercularis*" of writers. Thus the forked tailed Paradise Fish must stand as *Macropodus opercularis* (Linné), and, if we are to separate them, we must find another name for the round-tailed form.

Before going further, it will be well to define the status of the two fishes. That one is but a cultivated race of the other is entirely unbelievable to one who has bred both species in aquaria, and is familiar with the enormous percentage of "throwbacks" obtained in raising the cultivated forms of the Goldfish (*Carassius*). There is never the slightest tendency to reversion to

2. Amœn. Academ., IV, 1788, p. 428.

the round-tailed form seen in tens of thousands of Paradise Fishes, and the same may be said for the fewer numbers of the other fish I have examined. The Third Asiatic Expedition of the American Museum has recently collected very large series of both species in southern China and Hainan. There is no intergradation. However, it is possible there are two or more species of the *opercularis* type. Oshima has named the Formosan fish *Macropodus filamentosus*.[3] Brind[4] has described a variety from Hankow with a rounded caudal and attenuated *central* rays that I am not sure can be referred to either group, even though it has the large fins and bright colors of *opercularis*. It is likely nearer the round-tailed group, as the caudal would indicate.

Returning to the name of the round-tailed form, we find Bloch's *Chætodon chinensis*[5] to be the oldest available. But his figure does not well represent our fish, and most of Bloch's illustrations are fairly accurate. The fin rays and scales help us but little as they are extremely variable and apparently about the same in all. However, until it is possible to investigate the status of many apparently valid forms, such as *M. ocellatus* Cantor, it will be best to accept Bloch's name, and call the round-tailed fish *Macropodus chinensis*.

Oshima, when naming the Formosan form in 1919, appears not to have had Regan's 1909 paper before him, as he makes no mention of Regan's disposition of the name *Polyacanthus*. Oshima's application is, however, correct, whether or not we may agree with him as to its generic value. That *Polyacanthus* cannot be maintained on his characters seems indisputable, when we examine Brind's account of *M. ctenopsoides*. Besides, fine specimens of *M. chinensis* (employing our new terminology) occasionally have the dorsal rays slightly filamentous.

3. Ann. Carnegie Mus., XII, 1919, p. 278, pl. LII, fig. 2.
4. "Domesticated Fish", New York, 1914.
5. Ausländ. Fische, IV, 1790, p. 5, pl. CCXVIII, fig. 1.

To Oshima belongs the credit of pointing out (by inference) in a scientific paper, the distinctness of the two Chinese forms, but if we examine German aquarium literature we find that this was long ago recognized by aquarists in Europe.

The Hainan form of *Macropodus opercularis* differs from the mainland one in the narrower and more regular bars. In width they resemble Oshima's figure of *filamentosus*. It is possible that the Hainan form is distinct enough to be designated by a racial name, but further study is necessary to determine this. I recorded this fish from Hainan under the name *M. viridiauratus* in 1924.[6]

Recent authors, following Boulenger, have placed the African group comprising *Spirobranchus* and *Ctenopoma* with *Anabas*. This certainly is not correct, as Regan has indicated. *Spirobranchus* I have not seen, but I have examined specimens of *Ctenopoma nanum* (Günther) and the type of *Ctenopoma lineatum* (Nichols.) *Ctenopoma argentoventer* (Ahl) is very similar to the latter. *Pellegrini*, *multispinis*, and *nigropannosus* apparently form a group distinguished from the others by the strongly denticulate subopercle, and they may be congeneric with the Asiatic *Anabas testudineus*.

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NOTES ON CERTAIN HAWAIIAN FISHES

IN Copeia, No. 142, for May 20, 1925, p. 39, are two notes on Hawaiian fishes by Henry W. Fowler, concerning which a word more may be added.

Rooseveltia brighami (Seale) may be the same as *Serranus zonatus* Cuv. & Val., from Mauritius. The colors are similar, and a few shore fishes of Honolulu have a range thus wide. Gunther, however, declares this *zonatus* to be an *Anthias*, a genus far removed

6. Fish Culturist, III, 1924, p. 284.

from *Rooseveltia*. It is unsafe to unite species from widely separated localities without comparison of specimens. *Rooseveltia aloha* may be a synonym, although the single type specimen shows minor differences.

But *Rooseveltia* is well separated from the genus *Apsilus*, its nearest relative. The jaws in *Rooseveltia* have strong canines and the long, falcate pectoral which is, in this group, an important distinction, the fin being notably short in *Apsilus* as in *Aprion*. *Apsilus fuscus* is a more slender fish, dull colored and without canines, the tongue with small teeth. There are no lingual teeth in *Rooseveltia*.

Rhyacanthias carlsmithi Jordan is an Anthiine fish of rather deep water, killed in the eruption of Mauna Loa. Apparently Mr. Fowler is right in regarding the genus *Rhyacanthias* as inseparable from *Propoma* Günther (1880). The general aspect of *Propoma roseum* from the Ki Islands is the same, although Günther does not notice the peculiar form of the base of the lower mandible. But there is a still earlier name for the same genus, *Symphysanodon* Bleeker (1878). Neither Bleeker nor Günther observed the very minute teeth on the vomer and palatines and placed the genus among the *Pristipomidæ*. The three species, *Symphysanodon typus*, *S. roseus* and *S. carlsmithi* are much alike and may prove identical.

DAVID STARR JORDAN

THE DIAMOND-BACK TERRAPIN IN MASSACHUSETTS

IN 1870, J. A. Allen[1] first reported the occurrence of the Diamond-back Terrapin in Massachusetts. Later, in 1896, O. Bangs[2] also reported it from Buzzards Bay. While there are distributed along the eastern and

1. J. A. Allen. "Notes on Massachusetts Reptiles and Batrachians." Proc. B. S. N. H. Vol. XIII, 1870.
2. Outram Bangs. "An Important Addition to the Fauna of Massachusetts." Proc. B. S. N. H., Vol. XXVII, 1896.

southern coasts of the United States, four species and one sub-species of this terrapin, only one, *Malaclemys centrata concentrica*,[3] extends as far north as New England.

This species is characterized by its rough carapace, each shield containing a number of concentric, angular grooves, rising in step-like manner. Through the center of the shell projects a blunt serrated ridge or keel. In color the upper shell is grayish or olive, the under shell yellow with irregular black markings. The head, neck and extremities are gray, profusely marked with small black spots. Large specimens have a total length of ten inches, but such animals are now uncommon, especially in the northern portion of the range. The average length is perhaps six or seven inches. The females attain larger size than the males. A terrapin with a length of carapace of seven inches will weigh about two pounds and has a market value of about five dollars.

The habitat of this species is confined to salt marshes along the coast where it lives in the brackish waters and mud, although sometimes extending inland considerable distances along rivers. The food, in nature, consists largely of crustaceans and mollusks. It hibernates during cold weather.

In Massachusetts, this terrapin has been reported from Buzzards Bay, New Bedford, Wareham (Wareham and Acushnet rivers), Eastham, East Dennis, Barnstable, and Nantucket Island. A few years ago the Massachusetts Commissioners on Fisheries and Game exhibited two individuals taken in the salt marshes near Barnstable, Cape Cod. This record establishes a new northern limit of distribution. In order to reach Massachusetts Bay from Buzzards Bay it seems probable that instead of travelling around the uninviting outer coast of Cape Cod these wanderers passed up the Monument River at the head of Buzzards

3. W. P. Hay. "A Revision of Malaclemmys, a Genus of Turtles." Bull. Bureau of Fisheries, 1904.

Bay to points where its tributaries are in close proximity to those of the Scusset River, thence down that body of water to the Scusset marshes west of the town of Sandwich, and into Barnstable Bay (the present route of the Cape Cod Canal).

While the species is still common in certain southerly portions of its range, the inroads of commercial turtle-hunters have greatly reduced its numbers. It is not common in Massachusetts. Mr. Marcus Howes of Barnstable recently wrote: "They are not very plentiful now, although in years gone by, they were numerous. One fisherman here caught five in his eel pots this summer (1916)." That these turtles were common formerly in Buzzards Bay is evidenced also from the statement of Mr. Bangs that an old negro named Dempsy Hill caught and shipped them to market "by the barrel every winter." As to the natural occurrence of the Diamond-back in Massachusetts waters, Mr. Bangs says: "I have often heard the theory advanced that the terrapin was not native to Buzzards Bay and Cape Cod but had been introduced from the south. No one who advances this theory can give any facts relating to such an undertaking. It is a convenient way of explaining a rather unexpected fact in the distribution of animal life. Terrapin eight inches long are not less than fifty years old and they are not shipped to market much smaller than eight inches. Now to my own knowledge terrapin of this size have been sent from Buzzards Bay by the barrel every winter for the last fifteen years, so that either the supposed introduction must have taken place sixty-five years ago or they must have been introduced in such numbers that it would have cost thousands of dollars; a work that I think few people are philanthropic enough to undertake; also if the waters of Buzzards Bay and the south side of Cape Cod had

not been suited to the wants of the terrapin, it never could have gained a foothold there."[4]

While the Diamond-back is not sufficiently abundant in Massachusetts to be of much commercial importance, its popularity as an article of food on account of the excellent flavor of the flesh[5] has raised its value to a point where artificial propagation under favorable conditions, in southern portions of the range, promises to become a profitable commercial industry.[6]

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THE FASTING OF A COPPERHEAD

ON July 7th, 1924, a specimen of *Ancistrodon contortrix* was brought into the Boy Scout Zoo in the Palisades Interstate Park. It had been caught near Wild Cat Bridge in the same section several days before. Despite the fact that it was transported several hundred miles and was handled and exhibited many times, both indoors and out, it lived for a period of eleven months and is alive at the present writing (June 17, 1925). During all the time that it was in captivity this copperhead had absolutely nothing to eat. It would not touch any of the food placed in its cage. The skin was shed six times: August 7th, September 5th, December 2nd, February 14th, April 12th and June 2nd. This specimen spent a great deal of time in water and was observed to drink frequently.

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4. The writer liberated 200 young Diamond-Backs obtained from the Government Station at Beaufort, N. C., on the Scusset Marshes in Sandwich, Cape Cod, in June 1924, but has seen no evidence of them since.

5. As a delicacy to the epicure, the Diamond-back is in eastern United States, what the Green Turtle (marine) is in England and the Soft-shelled turtle in Japan.

6. For a description of methods of artificial propagation, see Economic Circular No. 5, (1913), Department of Commerce, U. S. Bureau of Fisheries.